

ANNUAL REPORT  
TO  
OFFICE OF NAVAL RESEARCH

DoD Science and Engineering Apprenticeship Program for  
High School Students

1994-'95 Activities  
Contract No. N00014-91-J-1825

Principal Manager: Dr. Richard L. Pfeffer  
Geophysical Fluid Dynamics Institute  
The Florida State University  
Tallahassee, FL 32306-3017  
(904)-644-5594



June 1995  
The Florida State University  
Tallahassee, Florida

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6. AUTHOR(S)

Richard L. Pfeffer

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Florida State University  
Geophysical Fluid Dynamics Institute  
Tallahassee, FL 323068. PERFORMING ORGANIZATION REPORT  
NUMBER:

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

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In the spring of 1994 the guidance counselors of five local high schools were asked to recommend outstanding college-bound students who they thought would benefit most from our program. Nine students were selected to participate starting in the summer 1994 and four during the school year, two of whom were from the summer program. Our student group consisted of two seniors, five juniors and four exceptional sophomores. The departure from our past concentration on seniors was motivated by our desire to expose students to science and scientific methodology at an earlier age. This report contains background information concerning the students who were selected.

Students spent a total of 30 hours per week with the program for 10 weeks in summer and 10-20 hours per week during the school year. They participated in the research program via data handling and data processing with the aid of computer operated equipment, and in enrichment activities during the summer; including lectures, laboratory demonstrations, scientific films, a formal course and a weekly discussion session on the history of science using the book COMING OF AGE IN THE MILKY WAY by Timothy Ferris.

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## 1. INTRODUCTION

The year 1994-'95 represented our thirteenth successful DoD Science and Engineering Apprenticeship Program for High School Students, sponsored by the Office of Naval Research at Florida State University. The program this year was again administered by the Geophysical Fluid Dynamics Institute (GFDI) under the direction of Dr. Richard L. Pfeffer. Student activities were centered at GFDI and included work experience in GFDI.

In the spring of 1994 the guidance counselors of five local high schools were asked to recommend outstanding college-bound students who they thought would benefit most from our program. Nine students were selected to participate starting in the summer of 1994 and four during the school year, two of whom were from the summer program. Our student group consisted of two seniors, five juniors and four exceptional sophomores. The departure from our past concentration on seniors was motivated by our desire to expose students to science and scientific methodology at an earlier age. Some background information concerning the students who were selected appears in the following section. Further information pertaining to each apprentice is attached at the end of the report.

Students spent a total of 30 hours per week with the program for 10 weeks in summer and 10-20 hours per week during the school year. They participated in the research program via data handling and data processing with the aid of computer operated equipment, and in enrichment activities during the summer; including lectures, laboratory demonstrations, scientific films, a formal course and a weekly discussion session on the history of science using the book *Coming of Age in the Milky Way* by Timothy Ferris. A summary of their activities and projects is included in section 3.

## 2. STUDENTS' VITAS

NAME: Elboni Austin  
RACE: Black  
SEX: Female  
HIGH SCHOOL: Godby High School  
ANTICIPATED COLLEGE: Still in High School (11<sup>th</sup> grade)  
ANTICIPATED MAJOR:  
AWARDS/SCHOLARSHIPS: NHS, Honor Roll each marking period, Spanish Award, Who's Who Among American High School Students, A representative in Leon County Association of Science Teaching  
ACTIVITIES/HOBBIES: Cheerleading ('89-'94), working at Legends, Church Choir

NAME: Jennifer Chen  
RACE: Asian  
SEX: Female  
HIGH SCHOOL: Lincoln High School  
ANTICIPATED COLLEGE: Cornell University  
ANTICIPATED MAJOR: Mechanical Engineering  
AWARDS/SCHOLARSHIPS: Awarded scholarships from Bracknell, Cornell, University of Florida, University of Virginia; JETS (Engineering) Team Competition Award; Magna Cum Laude; Pride Awards in Science and Mathematics; Academic Fitness Award; National Merit Scholar Nominee; Member National Honor Society; Silver Medal on National Latin Exam; 6<sup>th</sup> Place in Capital City Mu Alpha Theta; Supervisor of the Piano Guild  
ACTIVITIES/HOBBIES: Mu Alpha Theta, Latin Club, Piano

NAME: Brian Draper  
RACE: White  
SEX: Male  
HIGH SCHOOL: Godby High School  
ANTICIPATED COLLEGE: Florida State University  
ANTICIPATED MAJOR:  
AWARDS/SCHOLARSHIPS: Achievement Awards in Art, Science; American Legion Award for School; Service Medallion (ROTC); Good Cougar Award; Departmental Award in Computer Science  
ACTIVITIES/HOBBIES: Computer Programming, Computer Manufacturing, Running a BBS, Computer Graphics, Marine Biology, Teaching classes on the Internet in Word, DOS, Windows, VAX, UNIX, Macintosh

NAME: Andrea Hsia  
 RACE: Asian  
 SEX: Female  
 HIGH SCHOOL: Leon High School  
 ANTICIPATED COLLEGE: Still in High School (12<sup>th</sup> grade)  
 ANTICIPATED MAJOR: Medicine  
 AWARDS/SCHOLARSHIPS: Latin District Competition, Honorable Mention in Piano Concerto Competition, Magna Cum Laude on National Latin Exam, Superior in District Piano Festival.  
 ACTIVITIES/HOBBIES: Latin Club, Mu Alpha Theta, Choral Clubs, Pierian National Honor Society, Anchor Service Club, Cosmos Science Club, MOSAIC, Piano, Swimming

NAME: April Ivery  
 RACE: Black  
 SEX: Female  
 HIGH SCHOOL: Godby High School  
 ANTICIPATED COLLEGE: Florida State University  
 ANTICIPATED MAJOR: Medical  
 AWARDS/SCHOLARSHIPS: High Honor Roll, 2-year Honor from Who's Who of American High School Students, Congressional National Leadership Council  
 ACTIVITIES/HOBBIES: Gospel Choir, Church Choir, Unity Club, Anchor Club, FBLA, VOE, Spanish Club

NAME: Avesh Jain  
 RACE: Asian  
 SEX: Male  
 HIGH SCHOOL: Lincoln High School  
 ANTICIPATED COLLEGE: Still in High School (11<sup>th</sup> grade)  
 ANTICIPATED MAJOR: Medicine  
 AWARDS/SCHOLARSHIPS: Math Competition top 10, Numerous Tennis Awards  
 ACTIVITIES/HOBBIES: Computer, Tennis, Music

NAME: Craig Morris  
 RACE: Hispanic  
 SEX: Male  
 HIGH SCHOOL: Lincoln High School  
 ANTICIPATED COLLEGE: Florida State University  
 ANTICIPATED MAJOR: Biology  
 AWARDS/SCHOLARSHIPS: Honor Roll, Exceptional Student Award (freshman), State Convention awards for sports writing  
 ACTIVITIES/HOBBIES: Using Computers, Watching TV, Going out with friends

NAME: Matthew Nemethy  
RACE: White  
SEX: Male  
HIGH SCHOOL: Godby High School  
ANTICIPATED COLLEGE: Florida State University  
ANTICIPATED MAJOR: Environmental Engineering  
AWARDS/SCHOLARSHIPS: Who's Who of American High School Students, Commemorated National Merit Scholar, University Scholarship, Wal-Mart Scholarship, Florida Academic Scholarly Academic High School Scholar, High Honor Roll  
ACTIVITIES/HOBBIES: NME Participant, Second Place Team Chemathon, First Place Oratory Impromptu Speech Competition and Young Engineer of Florida

NAME: Smitha R. Pabbathi  
RACE: Asian  
SEX: Female  
HIGH SCHOOL: Leon High School  
ANTICIPATED COLLEGE: Florida State University  
ANTICIPATED MAJOR: Engineering  
AWARDS/SCHOLARSHIPS: National Honor Society  
ACTIVITIES/HOBBIES: Anchor, Latin Club, MAΘ, National Honor Society, Drawing, Reading

NAME: Jason Patterson  
RACE: White  
SEX: Male  
HIGH SCHOOL: Lincoln High School  
ANTICIPATED COLLEGE: Florida State University  
ANTICIPATED MAJOR: Math/Computer Science  
AWARDS/SCHOLARSHIPS: Rock Little Math Award, PRIDE Nominee, Presidential Academic Fitness Award, Florida Undergraduate Scholar Nominee, Magna Cum Laude, In top 4 in Regional Mu Alpha Theta Individual Contests  
ACTIVITIES/HOBBIES: Music, Computers, Math, Science

NAME:	Marion Smith
RACE:	White
SEX:	Male
HIGH SCHOOL:	Lincoln High School
ANTICIPATED COLLEGE:	Carnegie Mellon
ANTICIPATED MAJOR:	Engineering
AWARDS/SCHOLARSHIPS:	Valedictorian; President, Latin Club; Vice President, Science Club; Captain, First Place Lincoln Academic Team; Top Scorer, First Place (In the State) Science Bowl Team; Andrew Carnegie Scholarship; National Merit Finalist; 6 <sup>th</sup> Nationally in Roman Life Test at Junior Classical League Convention; Member of First Place Varsity JETS Team; Member of First Place Florida Chem-a-thon Team; Second Place in Individual Contests, Florida Chem-a-thon; Mu Alpha Theta for Computers, Calculus, Integral Calculus, and Precalculus; 1994 Georgia Tech Distinguished Math Scholar; Captain of First Place Brain Bowl Academic Team; 3 Consecutive Medals in National Latin Exam
ACTIVITIES/HOBBIES:	Computer Programming, Charter Member and Vice President of Lincoln High School Science Club, President of the Junior Classical League, Writer's Exchange

### 3. STUDENT WORK PROJECTS AND INSTRUCTION

Seven of the students participated in digitizing velocity vector data from photographs of flow fields obtained in laboratory experiments that simulate the influence of mountains on the atmospheric jet stream, and three assisted in data analysis using computer programs on PCs and the VAX. One student worked with Dr. Long on a special project to develop a method of objective analysis of digitized fluid flow data and will give a seminar about his results to next year's high school student group in July. These activities were part of a larger project on studies of the interaction of bottom topography with overlying baroclinic waves investigated by Drs. R. L. Pfeffer and R. Kung. The students' work was supervised by Mr. Eugene Arbogast and assisted by Messrs. Mike Ivey and Lester Joe Dennis.

The major project in which the students participated during the summer was the analysis of photographic velocity data from laboratory experiments on the interaction of topography with baroclinic waves, and flows with azimuthally varying lower thermal boundary conditions. The experiments were conducted in a thermally driven rotating annulus of fluid.



Craig Morris digitizes flow velocity data.

The data from the experiments were obtained by means of a camera, mounted at the top of a rotating annulus of fluid, which recorded the movements of laser-illuminated particles suspended in the fluid. The camera produced a sequence of still photographs; in each photograph the movement of every particle appeared as a string of dots. By digitizing the positions of these dots and calculating the distance between dots and the orientation of each string of dots, one can determine the velocity field as a function of time. Fourier analyses and energetics calculations of such data provide valuable information about the behavior of baroclinic waves in the presence of bottom topography.

The students had the opportunity to gain experience in the use of digitizing equipment, personal computers, and video monitors which display the work graphically as it is being digitized. They were also able to see and discuss the results of a first-level analysis of the digitized data performed on the GFDL DEC VAX computer cluster. During the course of the summer, the students worked with the photographs from several different experiments, which allowed them to see effects of variations in experimental parameters such as the difference in temperature between the inner and outer walls of the bath, the speed of rotation, and the presence or absence of topography.

The instruction and training given to the high school students concerning their work as apprentices went well beyond that needed to do the job. Efforts were made by the faculty and staff to make their work experience a learning process and an introduction to scientific methodology. Our goal was to ensure the students' understanding of the relationships between theoretical models and observable phenomena, such as the jet stream and ocean currents, such as the Gulf Stream and Kuroshio Current, which affect the transfer of heat from the tropics to the arctic. This was accomplished by explaining in detail the goals of the program, the scientific methodology, the implications of the experimental and related theoretical results and the contributions of the students' work to the overall project.

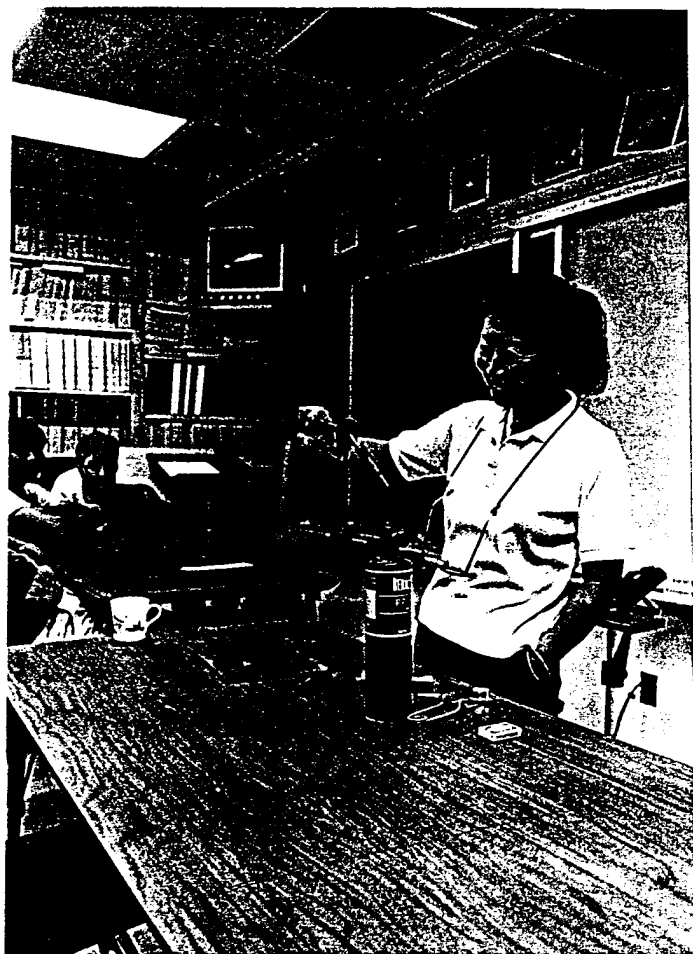
#### 4. ENRICHMENT ACTIVITIES

Aside from the students' activities as apprentices, they participated in a variety of other educational activities. These included a series of talks on research topics covering a broad spectrum of scientific disciplines. Talks were given by Drs. Blumsack, Elliott, Elsner, Furbish, Gruender, Howard, Kloesel, Ruby Krishnamurti, Kung, Long, Meacham, Nicholson and Pfeffer on topics ranging from the modeling of the Black Sea to Immunology and the HIV virus. In addition, the students participated in discussions with Dr. Long on the *Coming of Age in the Milky Way*, an exciting book on the history and methodology of physical science by Timothy Ferris. A series of scientific films was also selected and shown by Dr. Kung. These covered topics such as astronomy, the strange new science of deterministic chaos, space exploration, the oceans and others. Drs. Kung and Ruby Krishnamurti also engaged the students in a series of scientific experiments in which different natural phenomena were simulated in the laboratory. A list of these activities is given in Table 1.

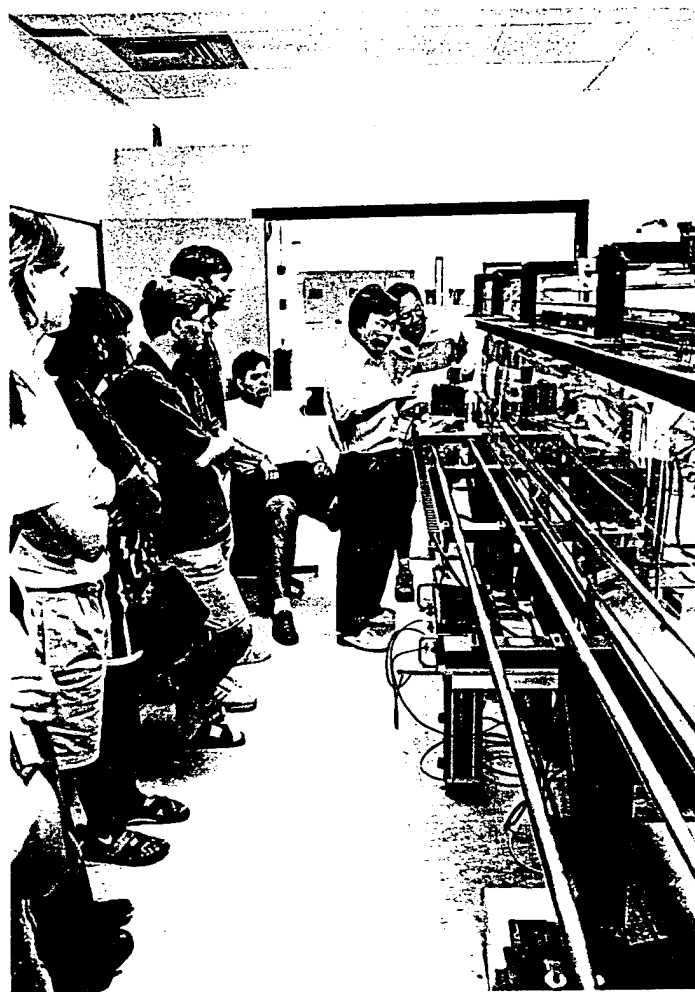
The students also took advantage of another opportunity offered by the program — namely, a course of their choice, with tuition and books paid for by the program. They took a Meteorology course for college credit given by Ms. Nancy Dignon.

#### 5. CONCLUSION

Questionnaires completed at the end of the summer program of enrichment activities revealed that the students felt that, aside from the monetary rewards, they had benefited a great deal from both the hands on work experience and the enrichment program. This was especially true of the younger students. They were grateful for the opportunity to work in a scientific environment and acquire new skills and experience. Faculty and staff mentors reported that the students were bright, attentive, well motivated and willing to work. Their contribution to the various projects was also significant. The digitizing work was done carefully and accurately and hence contributed substantially to a much needed data base for further analysis and study.

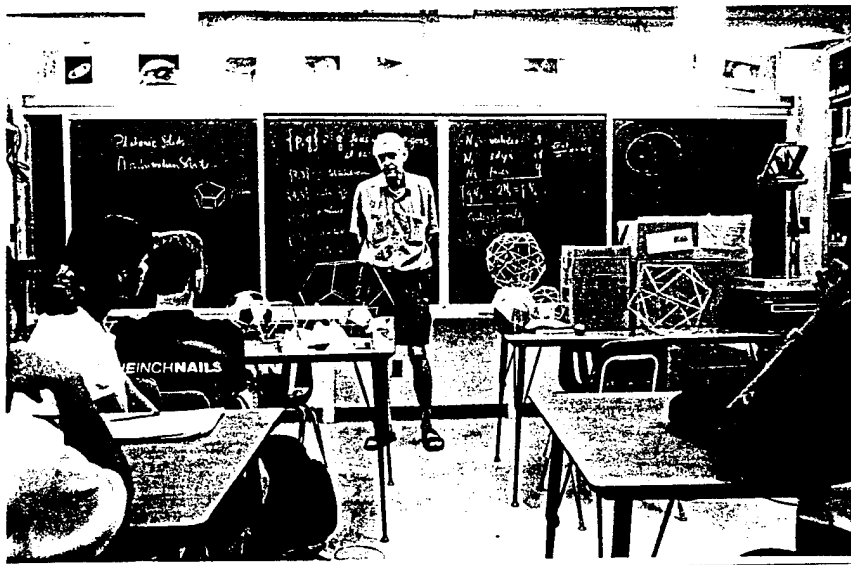


Dr. Ruby Krishnamurti demonstrates thermal oscillators.



The students visit the Mechanical Engineering Lab.

In general, the students felt financially rewarded and scientifically enriched by their experience in the program. We feel that the students acquired a certain maturity and confidence which should be a great asset to them during their final years in high school, college and their chosen careers.



Dr. Howard discusses the properties of regular polyhedrons with the students.



Dr. Buzyna lectures on supersonic flow after a visit to the Mechanical Engineering Fluids Lab.



Dr. Pfeffer interprets the results of the students' data analysis at an end of summer party. From left to right: Jennifer Chen, Trey Smith, Elboni Austin, April Ivery, Matthew Nemethy.

# 1994 ONR/GFDI Summer Enrichment Program Schedule

Time: 11:00 am to 12:00 noon; Place: GFDI Reading Room or as indicated

Monday Films	Tuesday Lab. Demonstrations	Wednesday Discussions**	Thursday Talks
June 6 (V70492) <i>The Shores of the Cosmic Ocean</i> (COSMOS Episode 1)	7 Dr. Robin Kung <i>Lab. Experiments at GFDI</i>	8 Dr. Christopher Long <i>The Dome of Heaven &amp; Raising the Roof</i>	9 Dr. Richard Pfeffer <i>Simulating the Atmospheric Jet Stream in the Laboratory</i>
13 (V70494) <i>The Traveler's Tales</i> (COSMOS Episode 6)	14 Dr. Ruby Krishnamurti <i>Rayleigh-Benard Convection</i>	15 Dr. Christopher Long <i>The Discovery of the Earth</i>	16 Dr. Louis Howard <i>Semi Regular Polyhedra</i>
20 (V70495) <i>Travels in Space and Time</i> (COSMOS Episode 8)	21 (Discussion) Dr. Christopher Long <i>The Sun Worshippers</i>	22 (Lab. Demonstration) Dr. George Buzyna (at M. E. Lab.) <i>Supersonic Flow</i>	23 Dr. James Elsner <i>Searching for Certainty- What Meteorologists Can Know About the Future</i>
27 (V70498) <i>Who Speaks for Earth</i> (COSMOS Episode 13)	28 Dr. Ruby Krishnamurti <i>Double-Diffusive Instability</i>	29 Dr. Christopher Long <i>The World in Retrograde</i>	30 Dr. Steven Blumsack <i>Conjectures of Mathematics</i>
July 4 Holiday	5 Dr. Robin Kung <i>Annulus Experiments</i>	6 Dr. Christopher Long <i>Newton's Reach</i>	7 Dr. David Gruender <i>Galileo and How the World Turns</i>
11 (V70306) <i>Strange New Science of Chaos</i> (NOVA)	12 Dr. Ruby Krishnamurti <i>Thermal Oscillators</i>	13 Dr. Christopher Long <i>A Plumb Line to the Sun</i>	14 Dr. Paul Elliott <i>Immunology and the HIV Virus</i>
18 (V70927) <i>Astronaut's View of Earth</i>	19 Dr. Robin Kung <i>Rotating Fluid Flows</i>	20 Dr. Christopher Long <i>Deep Space</i>	21 Dr. Kevin Kloesel <i>The Rocket Ozone Experiment</i>
25 (F382440) <i>The Trigger Effect</i> (Connections 1)	26 Dr. Chiang Shih (at M. E. Lab.) <i>Velocity Measurements by Particle Image Method</i>	27 Dr. Christopher Long <i>Island Universes</i>	28 Dr. Stephen Meacham <i>Modeling of Black Sea</i>
August 1 (F382450) <i>Death in the Morning</i> (Connections 2)	2 Dr. Ruby Krishnamurti <i>Mixing and Unmixing</i>	3 Dr. Christopher Long <i>Einstein's Sky</i>	4 Dr. David Furbish <i>Ocean Tides, Atmospheric Pressure and Ground Water Flow</i>
8 (F382510) <i>Eat, Drink and Be Merry</i> (Connections 8)	9 Dr. Robin Kung <i>Temperature Calibrations</i>	10 Dr. Christopher Long <i>The Expansion of the Uni- verse</i>	11 Dr. Sharon Nicholson <i>The Namib Desert — An example of Earth System Interaction</i>

\*\* Chapter by chapter discussion of "Coming of Age in the Milky Way" by Timothy Ferris, Anchor Books, 1988.

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1. Name: AUSTIN ELBONI  
last first
2. [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED]
3. School Address, 19 93-'94, if applicable Godby (904) 488-1325  
name phone  
1717 W. Tharpe St., Tallahassee, FL
4. Expected Major/University Enrolled in: \_\_\_\_\_
5. Last Grade Completed 10 Type of School: ☒ Public ☐ Private
6. Race/Ethnicity: (Voluntary) ☒ Black ☐ White ☐ Hispanic ☐ Asian ☐ Other
7. Sex: ☐ Male ☒ Female WGPA: 4.28
8. Installation Geophysical Fluid Dynamics Institute, Florida State University  
name  
Dr. Robin J. Kung, Associate Scholar/Scientist
9. Mentor(s): Dr. Richard L. Pfeffer, Professor of Meteorology and GFDI Associate  
name title
10. Principal Discipline of Research: Atmospheric Sciences
11. Major Tasks Performed: Digitizing of velocity vectors from photographs of  
flow fields obtained in laboratory experiments.
12. Honors, Awards and Scholarships: NHS, Honor roll each marking period,  
Spanish Award, Who's Who Among American Highschool Students, A Representative  
in Leon County Association of Science Teaching.
13. Activities/Hobbies: Cheerleading ('89-'94), Working out of Legends, Singing  
in Church Choir.

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1. Name: Chen Jennifer  
                    last                      first
2. [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED] [REDACTED]
3. School Address, 19 93-'94, if applicable Lincoln (904 ) 487-2110  
  name                      phone  
3838 Trojan Trail, Tallahassee, FL
4. Expected Major/University Enrolled in: Mechanical Engineering/Cornell Univ.
5. Last Grade Completed 11                      Type of School: ( ☒ ) Public ( ) Private
6. Race/Ethnicity: (Voluntary) ( ) Black ( ) White ( ) Hispanic ( ☒ ) Asian ( ) Other
7. Sex: ( ) Male ( ☒ ) Female                      W GPA: 4.41 4.00
8. Installation Geophysical Fluid Dynamics Institute, Florida State University  
                    name  
                    Dr. Robin J. Kung, Associate Scholar/Scientist
9. Mentor(s): Dr. Richard L. Pfeffer, Professor of Meteorology and GFDI Associate  
                    name                      title
10. Principal Discipline of Research: Atmospheric Sciences
11. Major Tasks Performed: Digitizing of velocity vectors from photographs of  
flow fields obtained in laboratory experiments.
12. Honors, Awards and Scholarships: Silver medal on National Latin exam; 6th, Pre-  
calculus Capital City Mu Alpha Theta; 1st and 3rd, Latin State; Superior  
rating from Piano Guild; Awarded Scholarships from Bracknell, Cornell, Univ.  
of Florida, Univ. of Virginia; JETS (Engineering) team competition award;  
Graduating with Magna Cum Laude; Pride wards in Science and Mathematics;  
Academic Fitness Award; National Merit Scholar nominee; Member, National  
Honor Society.
13. Activities/Hobbies: Mu Alpha Theta, Latin Club, Piano.

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1. Name: Draper Brian  
last first
2. [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED]
3. School Address, 19 93-'94, if applicable Godby ( 904 ) 488-1325  
name phone  
1717 W. Tharpe St., Tallahassee, Fl
4. Expected Major/University Enrolled in: Florida State University
5. Last Grade Completed 11 Type of School: ( ☒ ) Public ( ☐ ) Private
6. Race/Ethnicity: ( Voluntary ) ( ☐ ) Black ( ☒ ) White ( ☐ ) Hispanic ( ☐ ) Asian ( ☐ ) Other
7. Sex: ( ☒ ) Male ( ☐ ) Female W GPA: 3.3
8. Installation Geophysical Fluid Dynamics Institute, Florida State University  
name  
Dr. Robin J. Kung, Associate Scholar/Scientist
9. Mentor(s): Dr. Richard L. Pfeffer, Professor of Meteorology and GFDI Associate  
name title
10. Principal Discipline of Research: Atmospheric Sciences
11. Major Tasks Performed: Digitizing of velocity vectors from photographs of  
flow fields obtained in laboratory experiments.
12. Honors, Awards and Scholarships: Achevement Award in Art, Science; Good Congus  
Award, American Legion Award for School; Departmental Award in Computer Science;  
Medallion (ROTC).
13. Activities/Hobbies: Computer Programming, Computer manufacturing, Running a  
BBS, Computer graphics, Marine Biology, Teaching classes on Internet, Word,  
DOS, Windows, VAX, UNIX, Macintosh.

### INFORMATION FOR EACH APPRENTICE

1. Name: Hsia Andrea  
last first
2. [REDACTED] [REDACTED]  
[REDACTED] [REDACTED]
3. School Address, 19<sup>93-'94</sup>, if applicable Leon High (904) 488-1971  
name phone  
Tennessee St., Tallahassee, FL
4. Expected Major/University Enrolled in: Probably Medicine (don't know what universit:
5. Last Grade Completed 11 Type of School: (☒)Public (☐)Private
6. Race/Ethnicity: (Voluntary) (☐)Black (☐)White (☐)Hispanic (☒)Asian (☐)Other
7. Sex: (☐)Male (☒)Female WGPA: \_\_\_\_\_
8. Installation Geophysical Fluid Dynamics Institute, Florida State University  
name  
Dr. Robin J. Kung, Associate Scholar/Scientist
9. Mentor(s): Dr. Richard L. Pfeffer, Professor of Meteorology and GFDI Associate  
name title
10. Principal Discipline of Research: Atmospheric Sciences
11. Major Tasks Performed: Digitizing of velocity vectors from photographs of  
flow fields obtained in laboratory experiments.
12. Honors, Awards and Scholarships: Latin District Competition - Placed in  
several categories. Piano Concerto Competition; Honorable Mention; Magna  
Cum Laude on National Latin Exam; Superior in District Piano Festival.
13. Activities/Hobbies: Latin Club, Mu Alpha Theta, Choral Clubs, Pierian National  
Honor Society, Anchor Service Club, Cosmos Science Club, MOSAIC Member of Leon's  
Literary Magazine Staff, Hobbies: Playing the piano, swimming.

## INFORMATION FOR EACH APPRENTICE

1. Name: Ivery April  
last first
2. [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED]
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1717 W. Tharpe St., Tallahassee, FL
4. Expected Major/University Enrolled in: Pre-Med/Florida State University
5. Last Grade Completed 10 Type of School: ( ☒ ) Public ( ☐ ) Private
6. Race/Ethnicity: ( Voluntary ) ( ☒ ) Black ( ☐ ) White ( ☐ ) Hispanic ( ☐ ) Asian ( ☐ ) Other
7. Sex: ( ☐ ) Male ( ☒ ) Female W GPA:
8. Installation Geophysical Fluid Dynamics Institute, Florida State University  
name  
Dr. Robin J. Kung, Associate Scholar/Scientist
9. Mentor(s): Dr. Richard L. Pfeffer, Professor of Meteorology and GFDT Associate  
name title
10. Principal Discipline of Research: Atmospheric Sciences
11. Major Tasks Performed: Digitizing of velocity vectors from photographs of  
flow fields obtained in laboratory experiments.
12. Honors, Awards and Scholarships: High Honor Roll, 2-year Honor from Who's  
Who of American High School Student, Congressional National Leadership  
Council.
13. Activities/Hobbies: Gospel Choir, Church Choir, Unity Club, Anchor Club,  
FBLA, VOE, Spanish Club.

### INFORMATION FOR EACH APPRENTICE

PII Redacted

13. Activities/Hobbies: Computers, Tennis, Music.

### INFORMATION FOR EACH APPRENTICE

1. Name: Morris Craig  
last first
2. [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED]
3. School Address, 1993-'94, if applicable Lincoln (904) 487-2110  
name phone  
3838 Trojan Trail, Tallahassee, FL
4. Expected Major/University Enrolled in: Biology/FSU
5. Last Grade Completed 10 Type of School: (☒)Public (☐)Private
6. Race/Ethnicity: (Voluntary) (☐)Black (☐)White (☒)Hispanic (☐)Asian (☐)Other
7. Sex: (☒)Male (☐)Female WGPA: \_\_\_\_\_
8. Installation Geophysical Fluid Dynamics Institute, Florida State University  
name  
Dr. Robin J. Kung, Associate Scholar/Scientist
9. Mentor(s): Dr. Richard L. Pfeffer, Professor of Meteorology and GFDL Associate  
name title
10. Principal Discipline of Research: Atmospheric Sciences
11. Major Tasks Performed: Digitizing of velocity vectors from photographs  
of flow fields obtained in laboratory experiments.
12. Honors, Awards and Scholarships: Honor Roll, Various Academic and Journalistic  
Achievements (i.e., Exceptional Student Award as a Freshman, State Conception  
Awards for Sports Writing).
13. Activities/Hobbies: Using computer, watching TV, going out with friends.

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1. Name: Nemethy Matthew  
last first
2. [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED] [REDACTED]
3. School Address, 19 93-'94, if applicable Godby ( 904 ) 488-1325  
name phone  
1717 W. Tharpe St., Tallahassee, FL
4. Expected Major/University Enrolled in: Environmental Engineering/FSU
5. Last Grade Completed 12 Type of School: ( ☒ )Public ( )Private
6. Race/Ethnicity: (Voluntary) ( )Black ( ☒ )White ( )Hispanic ( )Asian ( )Other
7. Sex: ( ☒ )Male ( )Female WGPA: 4.04
8. Installation Geophysical Fluid Dynamics Institute, Florida State University  
name  
Dr. Robin J. Kung, Associate Scholar/Scientist
9. Mentor(s): Dr. Richard L. Pfeffer, Professor of Meteorology and GFDI Associate  
name title
10. Principal Discipline of Research: Atmospheric Science
11. Major Tasks Performed: Digitizing of velocity vectors from photographs  
of flow fields obtained in laboratory experiments.
12. Honors, Awards and Scholarships: Who's Who Among American Highschool Students;  
Commerated National Merit Scholar; University Scholarship; Walmart Scholarship  
Recipiant; Florida Academic Scholarship; Academic High School Scholar; High  
Honor Roll; NME participant; Second Place Team Chemathon, First Place  
Oratory/Impromptu Speech Competition and Young Engineer of Florida.
13. Activities/Hobbies: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1. Name: Pabbathi Smitha R.  
                                last                                first
2. [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
PII Redacted
3. School Address, 19\_\_\_\_\_, if applicable Leon High, (904) 488-1971  
  name  phone  
W. Tennessee Street, Tallahassee FL
4. Expected Major/University Enrolled in: Engineering/FSU
5. Last Grade Completed 12      Type of School: (☒)Public   (☐)Private
6. Race/Ethnicity: (Voluntary)   (☐)Black   (☐)White   (☐)Hispanic   (☒)Asian   (☐)Other
7. Sex:   (☐)Male   (☒)Female      WGPA: 4.28
8. Installation Geophysical Fluid Dynamics Inst., FSU, Tallahassee, FL 32306  
                                name  
                                Dr. Robin Kung, Associate Scholar/Scientist
9. Mentor(s): Dr. Richard L. Pfeffer, Professor of Meteorology and GFDL Associate  
                                name  title
10. Principal Discipline of Research: Atmospheric Science
11. Major Tasks Performed: Digitizing of velocity vectors from photographs of  
flow fields obtained in laboratory experiments.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
12. Honors, Awards and Scholarships: National Honor Society  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
13. Activities/Hobbies: Anchor, Latin Club, MAE, National Honor Society,  
enjoy drawing and reading.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1. Name: Patterson Jason  
last first
2. [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED]  
PII Redacted
3. School Address, 19 93-'94, if applicable Lincoln ( 904 ) 487-2110  
name phone  
3838 Trojan Trail, Tallahassee, FL
4. Expected Major/University Enrolled in: Math & Computer Science/Florida State
5. Last Grade Completed 11 Type of School: ( ☒ ) Public ( ☐ ) Private
6. Race/Ethnicity: ( Voluntary ) ( ☐ ) Black ( ☒ ) White ( ☐ ) Hispanic ( ☐ ) Asian ( ☐ ) Other
7. Sex: ( ☒ ) Male ( ☐ ) Female WGPA: 4.41
8. Installation Geophysical Fluid Dynamics Institute, Florida State University  
name  
Dr. Robin Kung, Associate Scholar/Scientist
9. Mentor(s): Dr. Richard L. Pfeffer, Professor of Meteorology and GFDL Associate  
name title
10. Principal Discipline of Research: Atmospheric Sciences
11. Major Tasks Performed: Digitizing of velocity vectors from photographs of flow  
fields obtained in laboratory experiments, Computer programming.
12. Honors, Awards and Scholarships: Consistently placed in top 4 in regional  
Mu Alpha Theta individual contests; Rock Little Math Award; PRIDE Nominee;  
Presidential Academic Fitness Award, Florida Undergraduate Scholar Nominee;  
Graduating Magna Cum Laude.
13. Activities/Hobbies: Music, computers, math, science.

### INFORMATION FOR EACH APPRENTICE

1. Name: Smith Marion  
last first
2. [REDACTED] [REDACTED] [REDACTED] [REDACTED]  
[REDACTED] [REDACTED] [REDACTED]
3. School Address, 19 93-'94, if applicable Lincoln ( 904 ) 487-2110  
name phone  
3838 Trojan Trail, Tallahassee, FL
4. Expected Major/University Enrolled in: Engineering/Carnegie Mellon
5. Last Grade Completed 11 Type of School: (x)Public ( )Private
6. Race/Ethnicity: (Voluntary) ( )Black (x)White ( )Hispanic ( )Asian ( )Other
7. Sex: (x)Male ( )Female WGPA: 4.7
8. Installation Geophysical Fluid Dynamics Institute, Florida State University  
name  
Dr. Robin J. Kung, Associate Scholar/Scientist
9. Mentor(s): Dr. Richard L. Pfeffer, Professor of Meteorology and GFDL Associate  
name title
10. Principal Discipline of Research: Atmospheric Sciences
11. Major Tasks Performed: Digitizing of velocity vectors from photographs of  
flow fields obtained in laboratory experiment, programming.
12. Honors, Awards and Scholarships: Valedictorian; President, Latin Club; Vice  
President, Science Club; Captain, First Place Lincoln Academic Team; Top  
Scorer, First Place (in the State) Science Bowl Team; Andrew Carnegie  
Scholarship; National Merit Scholar Finalist; 6th Nationally in Roman Life  
Test at Junior Classical League Convention; Member of First Place Varsity  
JETS Team; Member of First Place Florida Chem-a-thon; Mu Alpha Theta for  
Computers, Calculus, Integral Calculus, and Precalculus; 1994 Georgia Tech  
Distinguished Math Scholar; Captain of First Place Brain Bowl Academic Team;  
3 Consecutive Medals in National Latin Exam.
13. Activities/Hobbies: Computer Programming, Charter Member and Vice President of Lincoln High  
School Science Club, President of the Junior Classical League, Writer's  
Exchange.

INFORMATION FOR EACH MENTOR

- 1 NAME Arbogast Eugene  
last first
- 2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute  
name
- (904) 644-5594  
phone
- 3 [REDACTED] [REDACTED]  
[REDACTED]
- 4 SEX ( ) FEMALE (X) MALE
- 5 RACE/ETHNICITY: (Voluntary) ( ) Black (X) White ( ) Hispanic ( ) Asian ( ) Other
- 6 HIGHEST DEGREE EARNED Highschool Diploma
- 7 PRINCIPAL FIELD OF RESEARCH Geophysical Fluid Dynamics
- 8 NUMBER OF YEARS OF MENTORSHIP 2
- 9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1994 10

## INFORMATION FOR EACH MENTOR

1. Name: Long Christopher  
last first
2. Installation: Florida State University, Geophysical Fluid Dynamics Institute  
name  
(904) 644-5594  
phone
3. [REDACTED] [REDACTED]  
PII Redacted
4. Sex ☐ Female ☒ Male
5. Race/Ethnicity: (Voluntary) ☐ Black ☒ White ☐ Hispanic ☐ Asian ☐ Other
6. Highest Degree Earned: Ph.D.
7. Principal Field of Research: Atmospheric Sciences
8. Number of Years of Mentorship: 1
9. Number of Apprentices Supervised this Year, 19 <sup>94</sup> : 1

# INFORMATION FOR EACH MENTOR

- 1 NAME Kung Robin  
last first
- 2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute  
name
- (904) 644-5594  
phone
- 3 [REDACTED] [REDACTED]
- 4 SEX ( ) FEMALE ( ☒ ) MALE
- 5 RACE/ETHNICITY: (Voluntary) ( ) Black ( ) White ( ) Hispanic ( ☒ ) Asian ( ) Other
- 6 HIGHEST DEGREE EARNED Ph. D.
- 7 PRINCIPAL FIELD OF RESEARCH Geophysical Fluids Dynamics
- 8 NUMBER OF YEARS OF MENTORSHIP 10
- 9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 10

[PII Redacted]